

u-Substitution and Integration by Parts Problems

Evaluate each integral by using substitution or integration by parts.

1. $\int \frac{16x}{\sqrt{8x^2+1}} dx$

2. $\int x \sin \frac{x}{2} dx$

3. $\int 3\sqrt{\sin v} \cos v dv$

4. $\int_0^1 \frac{16x}{8x^2+2} dx$

5. $\int \theta \cos \pi\theta d\theta$

6. $\int \frac{dx}{\sqrt{x}(\sqrt{x}+1)}$

7. $\int \sec^2 \frac{t}{3} dt$

8. $\int \frac{1}{\theta^2} \sin \frac{1}{\theta} d\theta$

9. $\int t^2 \cos t dt$

10. $\int e^{\sqrt{3x+9}} dx$

11. $\int_0^1 x\sqrt{1-x} dx$

12. $\int \sin^{-1} y dy$

13. $\int_0^{\pi/3} x \tan^2 x dx$

14. $\int \ln(t+t^2) dt$

15. $\int \sin(\ln w) dw$

16. $\int x \sec^2 x dx$

17. $\int z(\ln z)^2 dz$

18. $\int_1^{e^{1/3}} \frac{dx}{x \cos(\ln x)}$

19. $\int_0^{\pi/2} \theta^2 \sin 2\theta d\theta$

20. $\int \sin^{-1} y dy$

21. $\int (x^2 - 5x)e^x dx$

22. $\int t^2 e^{4t} dt$

23. $\int_0^{\pi/2} x^3 \cos 2x dx$

24. $\int \frac{e^{\sqrt{t}}}{\sqrt{t}} dt$

Evaluate each integral by completing the square and using a substitution to reduce it to a basic form.

25. $\int_1^2 \frac{8}{x^2 - 2x + 2} dx$

26. $\int_2^4 \frac{2}{x^2 - 6x + 10} dx$

27. $\int \frac{dt}{\sqrt{-t^2 + 4t - 3}}$

Evaluate each integral by using algebra, a trig identity, and substitution to reduce it to a basic form.

28. $\int (\sec x + \cot x)^2 dx$

29. $\int \csc x \sin 3x dx$

30. $\int (\csc x - \tan x)^2 dx$